

Chapter 1 – Purpose of and Need for the Proposed Action

1.1 Introduction and Background

The Bureau of Reclamation, Provo Area Office (Reclamation) proposes to replace the concrete spillway structure at Scofield Dam, the principal feature of the Scofield Project. This construction project would be completed under the Safety of Dams (SOD) Act of 1978 (Public Law 95-578, as amended). The proposed SOD modifications would correct safety deficiencies of the dam without affecting the purpose, or benefits of the dam. Reclamation also proposes to replace the existing gate house at its current position on the crest of the dam. This building is in poor condition and would be replaced with either a new concrete structure or a metal building.

Concurrent with Reclamation's replacement of the spillway, the Utah Department of Transportation (UDOT) proposes to remove and replace the bridge on State Highway 96 (SR-96) that crosses over the spillway of Scofield Dam. This bridge replacement would be funded by the Federal Highway Administration (FHWA). UDOT would also realign the roadway on either side of the bridge to improve the turning radius if funding becomes available. UDOT would need to obtain an easement from Reclamation for the new road alignment.

Scofield Dam and Reservoir are located approximately 22 miles northwest of Price, Utah, on the Price River, a tributary of the Green River. The first dam at this location was constructed by the Price River Water Conservancy District from 1925 through 1926. This original dam was determined to be unsafe, and could not be economically repaired. The existing dam was authorized by the Water Conservation and Utilization Act of 1939. Construction began in 1943. The dam was completed in June 1946. Scofield Dam was constructed for the purpose of providing water for Municipal and Industrial (M&I) and agricultural water use, recreation, flood-control, and fish and wildlife benefits.

Reclamation and FHWA are jointly preparing this environmental assessment (EA) as required by the National Environmental Policy Act of 1960 (NEPA) as amended, P.L. 91-90, and the Council on Environmental Quality, U.S. Department of the Interior and U.S. Department of Transportation regulations implementing NEPA. UDOT is assisting in the preparation of this EA as a cooperating agency.

This EA analyzes the potential impacts of the proposed SOD modifications and bridge replacement. If potentially significant impacts to the human environment are identified, a Notice of Intent to prepare a draft EIS would be published in the *Federal Register* and an environmental impact statement would be prepared. If no significant impacts are identified, Reclamation and FHWA would each issue a Finding of No Significant Impact (FONSI). Each FONSI would include the decision to proceed with a selected alternative.

This EA describes the environmental effects of four alternatives for addressing the safety deficiencies of Scofield Dam: the No Action and three separate Action Alternatives. The Action Alternatives are the Spillway Replacement Alternative and the Downstream Detour of SR-96 Alternative. The potential effects of these alternatives are discussed in Chapter 3. In accordance

with 40 CFR 1505, any of these alternatives, combinations or parts of these alternatives may ultimately be selected as the preferred alternative.

Under the No Action Alternative, Reclamation would not structurally modify the spillway to reduce the risks created by the spillway deficiencies. The existing spillway would remain in place and the current bridge would also remain in place. Regular maintenance activities would continue with some periodic minor rehabilitation over time. The no action alternative at Scofield Dam would ignore the identified unacceptable risk to the downstream population. Downstream residents would continue to live with an elevated risk of dam failure. Project benefits would continue until an emergency condition or failure occurred at the dam. Failure would result in the loss of lives, cause extensive property damage downstream, and loss of project benefits.

Under the Spillway Replacement Alternative, Reclamation would remove the spillway of the dam and replace it with a new spillway at or near its present location. Under this alternative, construction would commence in the spring of 2006 and continue into the late fall or early winter for two consecutive years. Assuming a normal precipitation year, the reservoir would not be allowed to fill completely during construction. A reservoir water level restriction of 10 feet below the maximum capacity of the reservoir would be established during construction.

SR-96 passes over the dam. This is the main access road for the town of Scofield and the coal mines in the valley above. Travel across the dam may need to be restricted to one lane of travel during extended periods of time and may be closed for relatively shorter periods. The bridge that currently passes over the dam's spillway has been deemed deficient by UDOT, and is in need of replacement. Under the Spillway Replacement Alternative, this bridge would be replaced with a larger, heavier bridge capable of handling modern day traffic design loads and incorporating modern UDOT and FHWA design standards.

The Downstream Detour of SR-96 Alternative is similar to the Spillway Replacement Alternative. It differs in the location and manner of detouring traffic around the construction area.

1.1.1 Safety of Dams (SOD) Program Overview

In keeping with the mission to ensure that Reclamation dams do not present unacceptable risk to people, property, and the environment, Reclamation's Dam Safety Program was officially implemented in 1978, with passage of the Reclamation Safety of Dams act, Public Law 95-578. This act was amended in 1984 under Public Law 98-404.

Dams must be operated and maintained in a safe manner. Safe operation is ensured through safety inspections, analyses utilizing current technologies, and designs and corrective actions taken if needed based on current engineering practices.

The primary emphasis of the Safety Evaluation of Existing Dams (SEED) program, a subtask under the SOD program, is to perform site evaluations and to identify potential safety deficiencies of Reclamation and other Interior bureaus' dams. The basic objective is to identify dams which pose an increased threat to the public and to quickly complete the related analyses in

order to expedite corrective action decisions and safeguard the public and associated resources.

The SOD program focuses on evaluation of Reclamation dams and implementing actions to resolve safety concerns. Under this program, Reclamation completes studies and identifies and accomplishes needed corrective actions for Reclamation dams. The selected course of action relies on assessments of risks and liabilities with environmental and public involvement issues incorporated into the decision making process.

1.1.2 SOD NEPA Compliance Requirements

As required by Section 5 of the Reclamation Safety of Dams Act, this EA must be completed and submitted to the Congress along with a technical report and other supporting information, in order to obtain authorization to proceed with the proposed SOD modifications. The information and analyses in the EA, including the description of the proposed SOD modifications and alternatives, represent the best available information at this stage of the SOD process for Scofield Dam. Further analysis after Congressional approval, but prior to or in the early stages of project initiation, may result in a need to modify the alternative selected for implementation. Project changes that are not specifically analyzed in this environmental assessment will be documented in the administrative record. Major changes, for which additional environmental analysis is appropriate, would be analyzed in a supplement to this EA. This supplement would be made available to the public upon request. If a Finding of No Significant Impact (FONSI) is completed, the FONSI would be modified if warranted by project changes and would also be made available to the public upon request.

1.2 Purpose of and Need for Proposed SOD Modifications and Bridge Replacement

The purpose of the proposed SOD modifications is to modify Scofield Dam, in a cost effective and structurally feasible manner, to meet current safety standards without affecting the purposes of the Scofield Project which are: to provide water for municipal and industrial (M&I) and agricultural water use, recreation, flood control, and fish and wildlife benefits. M&I water is provided to the cities of Price and Helper. The project is needed to correct, for the long term, previously identified unsafe conditions that currently exist at Scofield Dam and to comply with the Safety of Dams Act of 1978 (Public Law 95-578, as amended) thus insuring that the Scofield Dam is safe.

Another purpose of the proposed action is to replace and upgrade the existing bridge over the dam's spillway. This bridge has been deemed deficient by UDOT and would be replaced with a new bridge that is larger and capable of handling current traffic loads and meets design standards.

The current sufficiency rating of the bridge is 21.8. Ratings below 50 qualify for Federal bridge replacement funding. The bridge is experiencing deterioration and portions of the beams have significant concrete spalling which has exposed the reinforcing steel in the concrete. Twenty two percent of all the traffic crossing the dam consists of trucks. Both approaches to the bridge are on sharp curves. The southern curve radius would be enlarged and the roadway width would

be widened to meet current American Association of State Highway and Transportation Officials (AASHTO) and UDOT standards (see discussion below under the heading “**Bridge**”).

Investigations of Scofield Dam conducted under Reclamation's SOD Program have confirmed certain safety deficiencies that could contribute to catastrophic failure of the dam. In compliance with Reclamation's SOD program, this EA discloses and discusses recommendations to undertake corrective actions for modifying the dam. These actions would be accomplished for the following reasons:

- Reclamation is required to comply with stipulations stated in the Safety of Dams Act of 1978 (Public Law 95-578, as amended). This act and amendments direct the Secretary of the Interior to preserve the structural integrity of Reclamation dams by developing modifications that the Secretary determines may reasonably be required.
- Scofield Dam could be at risk of failure because of safety deficiencies. Dam failure could result in an uncontrolled release of water from the reservoir which could cause significant loss of life and property.
- Reclamation has a contractual obligation to continue water deliveries for irrigation and M&I uses. Such deliveries are dependent upon the existence and operation of Scofield Dam.
- Failure of the dam would eliminate flood protection benefits for the cities of Price and Helper and the surrounding areas.
- Scofield Reservoir provides essential fish and wildlife habitats which would be lost in the event of dam failure.
- Failure of Scofield Dam could cause significant disruption and degradation of fish and wildlife habitats located downstream from the dam. Water quality could be degraded.
- Failure of Scofield Dam would eliminate the recreational benefits associated with Scofield Reservoir and State Park.

SR-96

SR-96 crosses the crest of the dam and the spillway. Twenty two percent of all the traffic crossing the dam consists of trucks. This truck traffic is largely due to the coal mines located in Clear Creek and surrounding areas and recreational traffic (vehicles with trailers). Both approaches to the bridge are on sharp curves as SR-96 crosses Scofield Dam. The design speed for this segment of SR-96 is 20 mph. The southern approach has an approximate centerline radius of 75 feet while the northern approach has an approximately centerline radius of 115 feet. The minimum curve radius for the design speed is 81 feet. Therefore, part of this project includes increasing the southern curve radius to 81 feet to meet current AASHTO and UDOT

standards.

The roadway width along this section of SR-96 varies between 26 to 30 feet wide. Due to the limited width of the road, the location of the existing bridge and spillway, and the sharp curvature of the road, coal trucks and other vehicles with trailers have a difficult time negotiating the southern curve. As a result, several coal trucks have spilled their load into the reservoir and spillway. Along with improving the southern curve radius, the pavement would be widened to allow for large trucks with trailers to maneuver both curves and remain on the roadway.

Bridge

A Structural Inventory and Appraisal (SI&A) was made of the Scofield spillway bridge in November 2003. Each bridge is evaluated in accordance with the National Bridge Inspection Standards (NBIS) which is conducted by a qualified professional engineer (23 CFR 650 subpart C). The SI&A's are completed every two years. From the SI&A a sufficiency rating is calculated which is the "numerical rating of a bridge based on its structural adequacy and safety, essentially for public use, and its serviceability and functional obsolescence" (23CFR 650.403(b)). The sufficiency rating is comprised of the following components:

- 55% - Structural Adequacy
- 30% - Serviceability and Functional Obsolescence
- 15% - Essentially for public use

The Scofield spillway bridge received a sufficiency rating of 21.8% out of a possible 100%; the threshold for bridge replacement is 50% and below. From the Structural Inventory and Appraisal, the Scofield Spillway Bridge has been determined to be *Structurally Deficient and Functionally Obsolete* in accordance to the NBIS. Structurally Deficient refers to the overall condition of the bridge deck, superstructure (girders) and substructures (abutments and piles). Functionally Obsolete concerns the geometric capability of the bridge to carry traffic including bridge deck width, vertical and horizontal clearances, and roadway approaches to the bridge. Therefore, part of this project includes replacing the structurally deficient and functionally obsolete bridge.

1.3 Lead and Cooperating Agencies

Lead agencies in the preparation of this environmental assessment are Reclamation and FHWA. UDOT is a cooperating agency in this effort

1.4 Description of Scofield Dam and Operations

1.4.1 Scofield Dam

Scofield Dam is located in the northeast corner of Carbon County in central Utah, approximately 11 miles west of U.S. Highway 6 (Appendix A, Map 1). Situated on the Wasatch Plateau on the Price River, Scofield Reservoir has a total storage capacity of 73,600 acre-feet of water. SR-96 passes along the east side of the reservoir and provides access to the City of Scofield, coal mines,

and recreation areas. This highway crosses the crest of the dam (Appendix A, Map 2).

Scofield Dam is the principal feature of the Scofield Project. The dam is owned by the United States and operated by the Carbon Water Conservancy District (CWCD). Scofield Dam is operated for irrigation, flood control, recreation, fish and wildlife benefits, and M&I water supply. Scofield Reservoir stores water from Mud Creek, Fish Creek, and Pondtown Creek with the water from the reservoir being released to the Price River.

Scofield Dam, a zoned earthfill structure, was completed in 1946. As shown in Table 1.1, physical data for the dam includes a crest length of 575 feet, and a crest width of 30 feet. Total volume of fill in the embankment is 204,000 cubic yards of material consisting of earth, rock, and riprap material. The spillway is an uncontrolled concrete crest and concrete-lined chute at the right abutment (Appendix A, Map 3). A concrete slab protects the spillway slope downstream from the crest. The spillway crest elevation is 7617.5 feet above sea level.

The outlet works consist of a concrete conduit through the base of the dam. Release of water is accomplished by one 3.2 by 4.0 foot slide gate. Table 1.1 provides physical details regarding Scofield Dam and Reservoir.

Reclamation has primary jurisdiction over Scofield Dam, its appurtenant facilities, and the area immediately adjacent to the dam (Appendix A, Map 2) (Reclamation 2002). Reclamation is responsible for ensuring continued operation of the dam consistent with the authorized purposes of the Scofield Project. Irrigation and M&I water is delivered by the CWCD.

1.4.2 Scofield Reservoir

Scofield Reservoir was created by Scofield Dam and occupies lands not previously flooded along the Price River. Total capacity of the reservoir at elevation 7617.5 feet is 65,800 acre-feet, with a surface area of 2,810 acres (Please see Table 1.1).

Reclamation lands within and surrounding Scofield Reservoir, including the primary jurisdiction zone immediately surrounding the dam site are held in fee title, fee title subject to other uses such as grazing, and as flood easement. Recreational facilities in Scofield State Park and those on the reservoir are managed by the Utah Division of Parks and Recreation. Primary activities include boating, water skiing, and fishing, along with picnicking, and camping.

Table 1.1 Scofield Dam and Reservoir - Physical Data

Scofield Dam	
Type	Zoned earthfill
Construction period	1943-46
Date of closure (first storage)	1945
Structural height	125 feet
Hydraulic height	55 feet
Top width	30 feet
Dam crest EL	7636 feet
Crest length	575 feet
Total volume	204,000 cubic yards
Scofield Reservoir	
Average annual inflow, 1942-53	57,600 acre-feet ¹
Total capacity to EL 7630.0	73,600 acre-feet
Active capacity, EL 7586-7617.5	65,800 acre-feet
Dead pool	7,800 acre-feet
Surface area	2,810 acres
Spillway	
Spillway: Uncontrolled concrete crest and concrete-lined chute located on the right abutment	Crest at elevation 7617.5 feet Capacity of 6200 ft ³ /sec at elevation 7630 feet
Outlet Works	
Outlet works: Concrete conduit through base of dam, controlled by one 3.2- by 4.0-foot slide gate	Capacity of 500 ft ³ /sec at Elevation 7630 feet
Foundation	
Foundation: Alternate layers of horizontally bedded sandstone and shale	

¹ Acre-foot = 1 acre-foot covers an area of 1 acre (approximately the size of a football field) to a depth of 1 foot.
EL = elevation

1.5 Summary of Scofield Dam Safety Hazards

Potential safety hazards affecting Scofield Dam were investigated in 2004 pursuant to the Reclamation Safety of Dams Act (P.L. 95-578, as amended). The investigations identified the following hazards to the project.

Spillway

The transverse joints are the features of the spillway which have the potential to initiate a failure mode for the dam due to hydraulic jacking of the concrete spillway slabs during operation of the spillway. Hydraulic jacking is a process where water entering under the concrete slab creates water pressure that pushes the slab up and out of its position. Because of the early date of construction, the transverse joints do not have waterstops or shear reinforcement incorporated into their design which would be considered a standard feature today. The hydraulic jacking failure mode is caused by spillway flows being directed under the chute floor slabs through openings and offsets at the transverse joints (Stanton 2004³). The water entering the joints

initiates stagnation pressure under the slabs since this water can not be released at a sufficient rate by the drains under the spillway to relieve the build up of water pressure. The resultant water pressure can force the slab up out of its place.

The concrete spillway has deteriorated. Most of this deterioration has been caused by freeze-thaw damage and some alkali-silica reaction. This deterioration is expected to continue at an increasing rate. Several attempts have been made since the late 1970's to repair the spillway. Based on the depths of the freeze-thaw damage, the widespread areas of deterioration, and the history of past repair attempts, it has been determined that further efforts to repair these conditions would not be effective.

The spillway in its present condition has a high failure potential for relatively frequent flood events. Based on Reclamation's risk analysis procedures, risk reduction actions are appropriate and corrective measures need to be taken (Stanton 2004²).

SR-96

SR-96 crosses the crest of the dam and the spillway. This highway carries a considerable amount of traffic. Much of this traffic consists of semi-trucks from the coal mines to the south of the dam.

The bridge over the spillway is in need of replacement. It is experiencing deterioration and portions of the beams have significant concrete spalling which has exposed the reinforcing steel in the concrete. The bridge has been struck by semi-trucks on several occasions. UDOT plans to replace the bridge. They are considering widening the bridge and enlarging the curve radii of the road to improve safety at the site. Reclamation is working with UDOT to allow the repair to the dam and road/bridge reconstruction to proceed concurrently and under the same construction contract.

1.6 Decisions to Be Made

Reclamation will use this EA and other relevant information to determine whether to request Congressional authorization to proceed with the proposed SOD modifications. FHWA will use this EA and other relevant information to determine whether to provide funding to UDOT for bridge replacement.

1.7 Permits and Authorizations

If the U.S. Congress authorizes this project, Reclamation, in compliance with the Clean Water Act, would obtain the permits as shown in Table 1.2 from the Utah Division of Water Quality; U.S. Army Corps of Engineers (Corps); and Utah Department of Natural Resources, as necessary.

Table 1.2 Permits

Name of Permit	Compliance with the Clean Water Act Section No.	Issuing Agency
SOD Construction Authorization	NA	U.S. Congress
Storm Water Discharge Permit	402	Utah Division of Water Quality
U.S. Army Corps of Engineers 404 Permit*	404	The Corps Note: Generally, this permit is obtained for large projects affecting streams, lakes, or reservoirs, and associated wetlands. Under their permitting process, the Corps would obtain from the Utah Division of Water Quality a State Water Quality Certification (Section 401).
State Stream Alteration Permit*	404	Utah Department of Natural Resources Note: This permit is for small projects not affecting wetlands.
Utah Pollution Discharge Elimination Permit	402	Utah Division of Water Quality Note: This permit would be obtained if water is to be discharged as a point source into the Price River or if more than one acre of ground would be disturbed.

* Concurrent with the preparation of this EA, Reclamation will consult with the Corps and the Utah Department of Natural Resources to determine permit needs and will obtain the necessary permits prior to project implementation.

UDOT would need to obtain an easement from Reclamation covering the new alignment of SR-96.

In compliance with Cultural Resource and Native American laws, Reclamation will comply with the following Laws and Executive Orders (E.O.):

Cultural Resource Laws

- National Historic Preservation Act (16 U.S.C. 470 et seq., 1966)
- Archaeological Resources Protection Act (16 U.S.C. 470aa et seq., 1974)
- Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 FR 44716)

Native American Laws

- American Indian Religious Freedom Act of 1978 (43 U.S.C. 1996)
- Enhancing the Intergovernmental Partnership, E.O. 12875, October 26, 1993 [58 *Federal Register* 58093]
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001)
- Consultation and Coordination with Tribal Governments, E.O. 13084, May 14, 1998
- Protection of Indian Sacred Sites, E.O. 13007, May 24, 1996 [61 *Federal Register* 26771]

Consultation with the Utah State Historic Preservation Office and the Advisory Council on Historic Preservation is in progress at this time. Consultation with the Utah Geological Survey for paleontological concerns, and the Northern Ute Tribe of the Uintah and Ouray Reservation in Fort Duchesne, Utah, has been completed.

1.8 Resource Issues

The following resource issues listed in random order have been identified, through scoping activities conducted by Reclamation and FHWA, as those that should be analyzed in detail in this EA: Recreation; water resources; water quality; public safety, access, and transportation; visual quality; socioeconomics; cultural resources; paleontological resources; wetlands and vegetation; wildlife resources; threatened, endangered and state sensitive species; Indian trust assets; and environmental justice. Other resources considered include land use, pedestrian and bicycle traffic, air quality, noise, invasive species, and prime or unique farmland.